Chapter: Quadrilateral
Page no.: 185
Exercise: 15

Question 1:
(i)
Solution: A quadrilateral has 4 Sides.

(ii)
Solution: A quadrilateral has 4 Angles.

(iii)
Solution: A quadrilateral has 4 Vertices, no three of which are co-linear.

(iv)
Solution: A quadrilateral has A quadrilateral has 2 Diagonals

(v)
Solution: A diagonal of a quadrilateral is a line segment that joins two opposite vertices of the quadrilateral.

(vi)
Solution: The sum of the angles of a quadrilateral is 360^o.

Question 2:
(i)
Solution: There are four pairs of adjacent sides, namely *(AB, BC), (BC, CD), (CD, DA)* and *(DA, AB).*

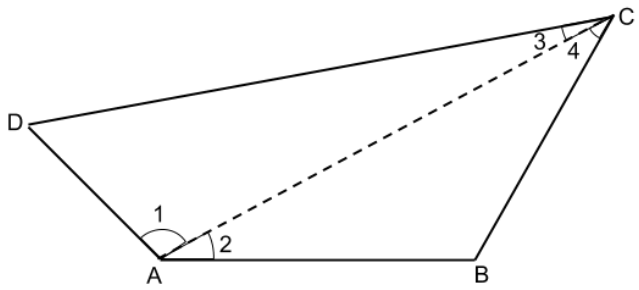
(ii)
Solution: There are two pairs of opposite sides, namely (*AB, DC*) and *(AD, BC*).

(iii)
Solution: There are four pairs of adjacent angles, namely $\angle A, \angle B, \angle B, \angle C, \angle C, \angle D$ and $\angle D, \angle A$.

(iv)
Solution: There are two pairs of opposite angles, namely $\angle A, \angle C$ and $\angle B, \angle D$

(v)
Solution: There are two diagonals, namely *AC* and *BD*.

Question 3:
Solution:



Let *ABCD* be a quadrilateral.
Join *A* and *C*.
Now, we know that the sum of the angles of a triangle is 180^o.
For $\triangle ABC: \angle 2 + \angle 4 + \angle B = 180^o$ ... (1)
For $\triangle ADC: \angle 1 + \angle 3 + \angle D = 180^o$ ... (2)
Adding (1) and (2):
$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle B + \angle D = 360^o$
or $\angle A + \angle B + \angle C + \angle D = 360^o$
Hence, the sum of all the angles of a quadrilateral is 360^o.

Question 4:
Solution: Sum of all the four angles of a quadrilateral is 360^o.
Let the unknown angle be x°.
$76^o + 54^o + 108^o + x = 360^o$
$238^o + x = 360^o$.
$X = 122^o$

the fourth angle measures 122^o.

Question 5:
Solution:
Let the measures of the angles of the given quadrilateral be (3x)°, (5x)°, (7x)° and (9x)°.
Sum of all the angles of a quadrilateral is 360^o.
$\therefore 3x+5x+7x+9x=360^o$
$24x=360^o$
$X = \frac{360^o}{24}$

x=15

Angles measure: $(3\times15)^o = 45^o$

$(5\times15)^o = 75^o$

$(7\times15)^o = 105^o$

$(9\times15)^o = 135^o$

Question 6:

Solution:

Sum of the four angles of a quadrilateral is 360^o.

If the unknown angle is x^o, then:

$75 + 75 + 75 + x = 360^o$.

$X = 360^o - 225^o$

$X = 135^o$

the fourth angle measures 135^o

Question 7:

Solution:

Let the three angles measure x^o each.

Sum of all the angles of a quadrilateral is 360^o

$\therefore x + x + x + 120^o = 360^o$

$3x + 120^o = 360^o$

$3x = 240^o$

$X = \frac{240^o}{3}$

$x = 80^o$

each of the equal angles measure 80^o

Question 8:

Solution:

Let the two unknown angles measure x^o each.

Sum of the angles of a quadrilateral is 360^o

$\therefore 85^o + 75^o + x + x = 360^o$

$160^o + 2x = 360^o$

$2x = 360^o - 160^o$

$2x = 200^o$

$X = \frac{200^o}{2}$

$X = 100^o$

each of the equal angle measures 100^o.

Question 9:

Solution:

Sum of the angles of a quadrilateral is 360^o.

$\therefore \angle A + \angle B + 60^o + 100^o = 360^o$

$\angle A + \angle B = 360^o - 100^o - 60^o = 200^o$

Or

$\frac{1}{2}\angle A + \angle B = 100^o$ ... (1)

Sum of the angles of a triangle is 180°.

In $\triangle APB$:

$\frac{1}{2}\angle A + \angle B + \angle P = 180^o$ (because AP and PB are bisectors of $\angle A$ and $\angle B$)

Using equation (1):

$100^o + \angle P = 180^o$

$\angle P = 80^o$

$\angle APB = 80^o$